Claims

1. Element having
   - a substrate (10) of a hard metal or cermet comprising hard material particles (20) and binding material (22)
   - and a diamond layer (30)
   - wherein the diamond layer (30) is disposed over a first region (24) of intact substrate material within which hard material particles (20) are surrounded by binding material (22)
   - wherein the transition region of the first region (24), which is disposed towards the diamond layer (30), comprises a depth profile having indents (18) and elevations (16)
   - and wherein the diamond layer (30) is braced with the substrate material (10) such that portions (32) of the diamond layer (30) are disposed deeper in the substrate (10) than elevations (16) of the first region (24).

   characterised in that
   - **between the first region (24) and the diamond layer (30) there is disposed a porous zone (26) in which hard material particles (20) are free of binding material (22)**
   - **wherein the hard material particles (20) form an intact hard material particle structure within the porous zone and are not weakened at the grain edges by etching.**

2. Element according to Claim 1 wherein
   - the porous zone (26) comprises an average thickness of 3 – 7 µm.

3. Element according **to one of the preceding claims** wherein
   - the porous zone (26) comprises an average thickness d
   - and the depth profile of the transition region of the first region (24) comprises an average peak-to-valley height Rz and a maximum peak-to-valley height Rmax
   - wherein d is less than or equal to Rmax
   - and preferably d is less than or equal to Rz.

4. Element according to one of the preceding claims wherein
   - the substrate material contains WC hard material particles (20) and a binder (22) containing Co
   - wherein the grain size of the hard material particles (20) is less than 0.8 µm and preferably less than 0.5 µm.

5. Element according to one of the preceding claims wherein
   - the binding material (22) contains 3 to 12 % and preferably more than 6 % and particularly preferably 8 to 10 % cobalt.

6. Element according to one of the preceding claims wherein
   - the transition region of the first region (24) comprises an average peak-to-valley height Rz of 1 to 20 µm, preferably 2 to 10 µm and particularly preferably 3 to 7 µm.

7. Element according to one of the preceding claims wherein
   - the average peak-to-valley height Rz of the transition region of the first region (24) is greater than the grain size of the hard metal, preferably more than five times the grain size of the hard metal.

8. Method for coating a substrate material (10) with a diamond layer (30) wherein the substrate material contains hard material particles (20) and binding material (22) wherein
   - a binding material-selective etching is executed in a first step, **wherein in a border edge zone (12) of the substrate (10) the binding material is removed**
   - a hard material-selective etching is executed in a second step, **wherein in the border zone (12) hard material particles (20) are completely removed so that a surface profile with elevations (16) and indents (18) is created**
   - a binding material-selective etching is executed in a third step, **wherein a binding material concentration on the surface is removed**
   - and the substrate (10) is coated with a diamond layer (30) thereafter.

9. Method according to Claim 8 wherein
   - the etching executed in the third step comprises a lesser etching depth than the etching executed in the first step.

10. Method according to Claim 8 or 9 wherein
   - in the second step the etching is executed with one of the following chemicals: compounds of potassium permanganate and caustic soda, compounds of potassium ferricyanide and caustic soda, caustic soda, caustic potash solution and/or sodium carbonate

11. Method according to one of the claims 8 to 10 wherein
   - in the third step the etching is executed as electrochemical etching with sulphuric acid and/or hydrochloric acid
   - or as chemical etching with HCl/H_2O_2 or H_2SO_4/H_2O_2.

12. Method for coating a substrate material (10) with a diamond layer (30) wherein the substrate material (10) comprises hard material particles (20) and surrounding binding material (22) wherein
   - in a first step a selective etching of the binding material (22) is executed,
   - hard material particles (20) are removed in a subsequent mechanical removal step by means of a blasting process with blasting particles
   - and the substrate (10) is afterwards coated with a diamond layer (30).

13. Method according to Claim 12 wherein
   - a binding material-selective etching step is executed after the mechanical removal step.

14. Method according to Claim 12 or 13 wherein
   - a cleaning step is executed before the coating.

15. Method according to one of the claims **12-14** wherein
- the blasting particles consist of SiC and comprise a grain size of less than 100 µm.

16. Method according to one of the claims **8** to **15** wherein
- in the first step an average etching depth of 1 to 20 µm, preferably 2 to 10 µm and particularly preferably 3 to 7 µm is achieved.

17. Method according to one of the claims **8 to 16** wherein
- in the first step the etching is executed with one of the following chemicals: HCl, HNO_3, compounds of H_2SO_4 and H_2O_2, compounds of HCl and H_2O_2.

18. Method according to one of the claims **8 to 17** wherein
- the diamond layer (30) is applied by means of CVD.